balloons of paper, which are then filled by the hot air rising from a samovar or a lamp. Many readers will undoubtedly recall the circumstances attending the launching of such a balloon; the hot air enters the balloon, expanding its envelope, and the balloon tends to fly. This would not happen if the pressure in the balloon were not higher than the atmospheric pressure.

The question of this hydrostatic pressure, existing in all enclosures filled with a gas which is hot and for that reason lighter than air, is the basic one of the hydraulic theory of reverberatory furnaces. It is therefore desirable to give another example which occurs in daily life.

In a building piped for both gas and water it is very evident that the hydrostatic pressure of the water will be greater upon the lower floors than it will be upon the upper floors. Will it be the same for the gas? If, for example, the gas upon one floor has a pressure of 25 mm of water, what will be the gas pressure 10 m higher?

Assume that at the stopcock *R* (Fig. 12) the gas pressure is equal to that of the atmosphere. The pressure of the column of air per unit of surface, which is equal to (1.29 X10) kg, will be held in equilibrium by the weight of the column of gas 10 m

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in height, increased by the hydrostatic pressure 6 of the gas; the weight of a cubic meter of the gas is equal to 1.29X0.4, from which

FIG. 12.

$$1.29X10 = 1.29X0.4X10+6,$$

$d = 7$ kg 74 per square meter.

But the pressure of the gas at the point

R is not only equal to the atmospheric pressure, but exceeds it by 25 mm.

It is therefore necessary to add to both sides of the equation +25 mm. It follows that the gas pressure at the point *B* (since 1 kg per square meter is equivalent to 1 mm of water) may be expressed as follows:

5+25 = 32 mm 74,

that is to say, the pressure of the gas at the higher floors of the